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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/056,720	01/24/2002	Tomoki Kobayashi	IIW-016	2117
959	7590	07/26/2004		
LAHIVE & COCKFIELD, LLP. 28 STATE STREET BOSTON, MA 02109			EXAMINER TSANG FOSTER, SUSY N	
			ART UNIT	PAPER NUMBER
			1745	
DATE MAILED: 07/26/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/056,720

Applicant(s)

KOBAYASHI ET AL.

Examiner

Susy N Tsang-Foster

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 14-19 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-12 and 14-19 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 29 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is responsive to the amendment filed on 4/29/2004.

Previous art rejections based on either JP 2001-213605 A or Kelly (US. Pat. No. 6,586,124) are withdrawn by the Examiner in view of the certified English translation of the priority document for the present application.

For the purposes of prosecution of the instant claims, the Examiner is interpreting the term “compressed hydrogen” in a high pressure tank to be different from hydrogen stored in a metal hydride alloy in a high pressure tank as evidenced by the state of the art of hydrogen storage in the article “Hydrogen Storage” [online]. FuelCellStore.com 2002, 2003 [retrieved on 2004-07-24]. Retrieved from the Internet: <URL: http://www.fuelcellstore.com/information/hydrogen_storage.html>. It is clear from the original disclosure as a whole that applicant’s newly added term “compressed hydrogen” in a high pressure tank in claims 1 and 9 has support and does not constitute new matter. Therefore the JP 60-68 A reference cannot be applied against amended claims 1 and 9 because hydrogen stored in a metal hydride alloy in a high pressure tank is not the same as compressed hydrogen in a high pressure tank.

Claims 1, 9, and 12 have been amended. Claim 13 has been cancelled. Claims 1-12, and 14-19 are pending and are rejected for reasons given below. This Office Action is made non-final as new grounds of rejection are made that are not necessitated by applicant's amendment.

Drawings

2. The drawings were received on 4/29/2004. These drawings are approved by the Examiner.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-11, 16, and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the limitation "the hydrogen discharged from said high-pressure tank" lacks antecedent basis within the claim because the limitation "a high-pressure tank for storing compressed hydrogen gas at a pressure of at least 1 MPa" appears to recite the intended use of the high pressure tank and does not appear to positively recite that the high-pressure tank contains compressed hydrogen gas at a pressure of at least 1 MPa.

In claim 1, the limitation “a high-pressure tank for storing compressed hydrogen gas at a pressure of at least 1MPa” is indefinite because the temperature of the gas is not given and the pressure of a gas varies with temperature.

In claim 9, the limitation “a step for storing hydrogen from a high-pressure tank, which stores compressed hydrogen gas at a pressure of at least 1 MPa” is indefinite because the temperature of the gas is not given and the pressure of a gas varies with temperature.

In claim 16, the limitation “wherein said hydrogen is supplied to the fuel cell depending upon the anode pressure of the fuel cell” is indefinite because a fuel cell having an anode pressure would mean that it already contains hydrogen gas and hydrogen gas is being supplied to the anode chamber.

In claim 17, the limitation “wherein said hydrogen is supplied to the fuel cell depending upon the amount of hydrogen consumed by the fuel cell” is indefinite because hydrogen is being supplied by the fuel if an amount of hydrogen has been consumed by the fuel cell. It is also unclear how this amount of hydrogen consumed by the fuel cell is determined.

Claims depending from claims rejected under 35 USC 112, second paragraph are also rejected for the same.

Claim Rejections - 35 USC § 103

5. Claims 12, 14, 15, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's English Translation for JP 60-68 A submitted on 4/29/2004 in view of Kralick (US 6,350,535 B1).

The JP 60-68 A reference discloses a fuel cell apparatus comprising a fuel cell 15, a metal hydride 13 having a high hydrogen equilibrium dissociation pressure placed in tank 4 and a metal hydride 14 having a low hydrogen equilibrium dissociation pressure in tank 10 and the two tanks are coupled to each other through hydrogen transfer valves 11 and 12 (see also Figure 2). A heat exchanger 18 is contained in tank 10 and is coupled with a heat exchanger 16 which heats and cools the fuel cell 15 (see page 5 of applicant's translation). Page 5 of the translation also states that a "solvent for exchanging heat is transferred by means of a pump to circulate solvent so that heat can be smoothly transferred." Page 6 of the translation states "the heat is generated in the metallic hydride MH1 when hydrogen is occluded in the metallic hydride MH1. This heat can also be utilized to increase the temperature of the fuel cell so that the fuel cell can be started again at the time when the fuel cell is stopped."

The JP 60-68 A reference does not disclose that the solvent for exchanging heat is water and that the fuel cell generates power while warming up the fuel cell when the temperature of the fuel cell is within a given temperature range whose upper limit is the prescribed temperature and the warming up is performed with no power generation when the temperature of the fuel cell is under the lower limit of the given temperature range.

Kralick teaches water as a heat exchange medium between a fuel cell and a heat exchanger (col. 5, lines 30-31) and that if the reactant gas entering the inlet is warmer than the fuel cell stack, condensation might occur as the saturated gas is cooled to the stack temperature (col. 5, lines 45-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use water as the solvent for exchanging heat between the fuel cell and the metal hydride tank 10 because water is commonly used in the art as a heat exchange medium in a coolant circuit because water is non-corrosive, has high heat capacity, is non-toxic, and is easily replenished by the product water of the fuel cell.

It would have also been obvious to one of ordinary skill in the art at the time the invention was made to warm up the fuel cell to a given temperature without power generation or to warm up the fuel cell to a given temperature with power generation because the optimum condition of power generation depends on the relative temperature of the humidified reactant and the temperature of the fuel cell because if a humidified reactant gas entering the fuel cell has a higher temperature than the fuel cell temperature, condensation might occur and cause flooding of the fuel cell membrane that would be detrimental to power generation.

Art Unit: 1745

Response to Arguments

6. Applicant's arguments with respect to claims 1-12, and 14-19 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications should be directed to examiner Susy Tsang-Foster, Ph.D. whose telephone number is (571) 272-1293. The examiner can normally be reached on Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at (571) 272-1292.

The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

st/ 

Susy Tsang-Foster
Primary Examiner
Art Unit 1745